Amendments to the Claims

The following listing of the claims replaces all previous amendments and listings of the claims.

1.-16. (Canceled)

17. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a flocculating agent to flocculate a material in the sludge upstream of the liquid shear-stirrer;

shear-stirring the sludge and the flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agent to disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks; and

separating the flocks into a solid and liquid by a solid-liquid separator.

18. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a flocculating agent to flocculate a material in the sludge upstream of the liquid shear-stirrer;

shear-stirring the sludge and the flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agent to disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks; and

separating the aggregate structure type flocks into a solid and liquid by a solid-liquid separator.

19. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a flocculating agent to flocculate a material in the sludge upstream of the liquid shear-stirrer;

shear-stirring the sludge and the flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agent to disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks;

allowing the aggregate structure type flocks to gather to grow into a sludge block; and

separating the sludge block into a solid and liquid by a solid-liquid separator.

20. (New) The process for treating sludge according to any one of claims 17 to 19, further comprising:

flowing the sludge downstream of the liquid shear-stirrer as a laminar flow to prevent destruction of flocks or aggregate structure type flocks or sludge block formed in the sludge treatment line.

21. (New) The process for treating sludge according to any one of claims 17 to 19, wherein a distance between the flocculating agent injection part and the liquid shear-stirrer is set such that the flocculating agent passes through in a reaction initiation time obtained in advance for each flocculating agent.

22. (New) The process for treating sludge according to any one of claims 17 to 19, wherein at least one of a distance from the liquid shear-stirrer to the flocculating agent injection part and a distance from the liquid shear-stirrer to the solid-liquid separator is set

such that flocculation strengths based on flocculation lasting periods of time of flocks or aggregate structure type flocks or sludge block formed are maximized.

23. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the liquid shear-stirrer;

shear-stirring the sludge and the first flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part downstream of the liquid shear-stirrer in the sludge treatment line to form flocks; and

separating the aggregate structure type flocks into a solid and liquid by a solid-liquid separator.

24. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the liquid shear-stirrer;

shear-stirring the sludge and the first flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part downstream of the first flocculating agent injection part in the sludge treatment line to form flocks,

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks; and

separating the aggregate structure type flocks into a solid and liquid by a solid-liquid separator.

25. (New) A process for treating sludge, comprising the steps of:

arranging a liquid shear-stirrer in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the liquid shear-stirrer;

shear-stirring the sludge and the first flocculating agent by rotating the liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part downstream of the first flocculating agent injection part in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks;

allowing the aggregate structure type flocks to gather to grow into a sludge block; and

separating the sludge block into a solid and liquid by a solid-liquid separator.

26. (New) The process for treating sludge according to any one of claims 23 to 25, further comprising:

flowing the sludge downstream of the liquid shear-stirrer as to prevent destruction of the flocks or aggregate structure type flocks or sludge block formed in the sludge treatment line.

27. (New) The process for treating sludge according to any one of claims 23 to 25, wherein a distance between the second flocculating agent injection part and the liquid shear-stirrer is set such that the flocculating agent passes through in a reaction initiation time obtained in advance for each flocculating agent.

28. (New) The process for treating sludge according to any one of claims 23 to 25, wherein at least one of a distance from the liquid shear-stirrer to at least one of the first and second flocculating agent injection parts and a distance from the liquid shear-stirrer to the solid-liquid separator is set such that flocculation strengths based on flocculation lasting periods of time of flocks or aggregate structure type flocks or sludge block formed are maximized.

29. (New) A process for treating sludge, comprising the steps of:

arranging first and second liquid shear-stirrers in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the first liquid shear-stirrers;

shear-stirring the sludge and the first flocculating agent by rotating the first liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part upstream of the second liquid shear-stirrer in the sludge treatment line;

shear-stirring the sludge and the first and second flocculating agents by rotating the second liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the second flocculating agent to disperse, diffuse or distribute the first and second flocculating agents in a fine particulate state throughout the sludge in the sludge treatment line to form flocks; and

separating the flocks into a solid and liquid by a solid-liquid separator.

30. (New) A process for treating sludge, comprising the steps of:

arranging first and second liquid shear-stirrers in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the first liquid shear-stirrers;

shear-stirring the sludge and the first flocculating agent by rotating the first liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part upstream of the second liquid shear-stirrer in the sludge treatment line;

shear-stirring the sludge and the first and second flocculating agents by rotating the second liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the second flocculating agent to disperse, diffuse or distribute the first and second flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks; and

separating the aggregate structure type flocks into a solid and liquid by a solid-liquid separator.

31. (New) A process for treating sludge, comprising the steps of:

arranging first and second liquid shear-stirrers in a sludge treatment line;

adding to sludge flowing in the sludge treatment line a first flocculating agent to flocculate a material in the sludge at a first flocculating agent injection part upstream of the first liquid shear-stirrers;

shear-stirring the sludge and the first flocculating agent by rotating the first liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the first flocculating agent to disperse, diffuse or distribute the first flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line;

adding to the sludge and the first flocculating agent a second flocculating agent at a second flocculating agent injection part upstream of the second liquid shear-stirrer in the sludge treatment line;

shear-stirring the sludge and the first and second flocculating agents by rotating the second liquid shear-stirrer at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the second flocculating agent to disperse, diffuse or distribute the first and second flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks;

allowing the aggregate structure type flocks to gather to grow into a sludge block; and

separating the sludge block into a solid and liquid by a solid-liquid separator.

32. (New) The process for treating sludge according to any one of claims 29 to 31, further comprising:

flowing the sludge downstream of the second liquid shear-stirrer as to prevent destruction of the flocks or aggregate structure type flocks or sludge block formed in the sludge treatment line.

33. (New) The process for treating sludge according to any one of claims 29 to 31, wherein a distance from the first flocculating agent injection part to the first liquid shear-stirrer or a distance from the second flocculating agent injection part to the second liquid shear-stirrer is set such that the flocculating agent passes through in a reaction initiation time obtained in advance for each flocculating agent.

34. (New) The process for treating sludge according to any one of claims 29 to 31, wherein at least one of a distance from the first liquid shear-stirrer to the first flocculating agent injection part, a distance from the second liquid shear-stirrer to the second flocculating agent injection part, and a distance from the second liquid shear-stirrer to the solid-liquid separator is set such that flocculation strengths based on flocculation lasting periods of time of flocks or aggregate structure type flocks or sludge block formed are maximized.

35. (New) A process for treating sludge, comprising the steps of:

arranging flocculating agent injection parts in a sludge treatment line;

arranging liquid shear-stirrers downstream of each of the flocculating agent injection parts;

adding to sludge flowing in the sludge treatment line flocculating agents to flocculate a material in the sludge at the flocculating agent injection parts;

shear-stirring the sludge and the flocculating agents by rotating the liquid shear-stirrers arranged downstream of each of the flocculating agent injection parts at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agents to disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks; and

separating the flocks into a solid and liquid by a solid-liquid separator.

36. (New) A process for treating sludge, comprising the steps of:

arranging flocculating agent injection parts in a sludge treatment line;

arranging liquid shear-stirrers downstream of each of the flocculating agent injection parts;

adding to sludge flowing in the sludge treatment line a flocculating agent to flocculate a material in the sludge at the flocculating agent injection parts;

shear-stirring the sludge and the flocculating agents by rotating the liquid shear-stirrers arranged downstream of each of the flocculating agent injection parts at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agents to disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment lineto form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks; and

separating the aggregate structure type flocks into a solid and liquid by a solid-liquid separator.

37. (New) A process for treating sludge, comprising the steps of:

arranging flocculating agent injection parts in a sludge treatment line;

arranging liquid shear-stirrers downstream of each of the flocculating agent injection parts;

adding to sludge flowing in the sludge treatment line a flocculating agent to flocculate a material in the sludge at the flocculating agent injection parts;

shear-stirring the sludge and the flocculating agents by rotating the liquid shear-stirrers arranged downstream of each of the flocculating agent injection parts at a speed of 200 to 2,000 rpm prior to an initiation of flocculation reaction of the flocculating agents to

disperse, diffuse or distribute the flocculating agent in a fine particulate state throughout the sludge in the sludge treatment line to form flocks;

allowing two or more flocks flowing in the sludge treatment line to gather to form aggregate structure type flocks;

allowing the aggregate structure type flocks to gather to grow into a sludge block; and

separating the sludge block into a solid and liquid by a solid-liquid separator.

38. (New) The process for treating sludge according to any one of claims 35 to 37, further comprising:

flowing the sludge downstream of the liquid shear-stirrer arranged the most downstream as to prevent destruction of the flocks or the aggregate structure type flocks or the sludge block formed in the sludge treatment line.

39. (New) The process for treating sludge according to any one of claims 35 to 37, wherein a distance from each of the flocculating agent injection parts to each of the liquid shear-stirrers is set such that the flocculating agent passes through in a reaction initiation time obtained in advance for each flocculating agent.

40. (New) The process for treating sludge according to any one of claims 35 to 37, wherein at least one of a distance from each of the liquid shear-stirrers to each of the flocculating agent injection parts and a distance from the liquid shear-stirrer arranged the most downstream to the solid-liquid separator is set such that flocculation strengths based on flocculation lasting periods of time of flocks or aggregate structure type flocks or sludge block formed are maximized.